

REMARKS

This Response to Non-Final Office Action is being submitted in response to the non-final Office Action mailed August 19, 2005. Claims 1-4 are pending in the Application. Claims 1-4 stand rejected. Specifically, Claims 1-4 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Applicants' admitted prior art in view of Brewer et al. (U.S. Patent No. 6,226,269).

In response to this rejection, Applicants offer the following remarks. These remarks are fully supported in the Specification, Drawings, and Claims of the Application and no new matter has been added. Based upon the remarks, reconsideration of the Application and withdrawal of the rejection is respectfully requested.

Rejection of Claims 1-4 Under 35 U.S.C. 103(a) – Brewer et al.:

Examiner rejects Claims 1-4 under 35 U.S.C. 103(a) as being unpatentable over Applicants' admitted prior art in view of Brewer et al. (U.S. Patent No. 6,226,269).

U.S. Patent No. 6,226,269 issued to Brewer et al. (hereinafter '269) discloses a method for replacing invalid data and invalid control signals in a loop network to prevent errors from propagating throughout the loop.¹ A hub port in a loop network detects and replaces invalid data and invalid control signals in the datastream of the loop. The hub port detects invalid data or invalid control signals or primitives received from an attached node port and substitutes buffer data or valid primitives.²

Nowhere in the '269 patent is there a mention of buffer-to-buffer credit. In buffer-credit flow control, the source and destination set the number of unacknowledged frames (buffer credits) allowed to accumulate before the source stops sending data. This is a

¹ U.S. Patent No. 6,226,269, Col. 3, lines 17-20.

² Id. at Col. 3, lines 24-32.

power of 2, such as 4, 8, or 16. In some storage area networks (SANs) it can range higher, but it is rare to have more than 256 buffer credits because of cost constraints. A counter at the source keeps track of the number of buffer credits. Each time a frame is sent by the source, the counter increments by 1. Each time the destination receives a frame, it sends an acknowledgment back to the source, which decrements the counter by 1. If the number of buffer credits reaches the maximum, the source stops transmission until it receives the next acknowledgement from the destination. This prevents loss of frames that may result if the source races too far ahead of the destination. As the length of a fiber optic cable span increases for a given throughput, the number of buffer credits required to ensure optimum performance increases in direct proportion. Also, as the throughput increases for a given span of fiber optic cable, the required number of buffer credits increases in direct proportion.

Respectfully, the '269 patent has nothing to do with buffer-to-buffer credits. It represents simply a line-level protection facility³ which is known to the Applicants, and disclosed in the Application as filed.⁴ It is the problems inherent with these protection

³ Id. at Col. 4, line 53 through Col. 5, line 9.

In operation, while valid data and valid primitives are being received from node port 308, output control circuit 316 selects input A of multiplexer 318 so that the valid data and primitives are output on outgoing internal hub link 324. Detect circuit 314 monitors the datastream received from node port 308. When detect circuit 314 detects an invalid primitive inside a data frame, detect circuit 314 sets a frame error flag. Alternatively, detect circuit 314 sets the frame error flag in response to detecting invalid data or invalid primitives inside a data frame. In response to setting of the frame error flag, output control circuit 316 selects data input B of multiplexer 318 so that a valid primitive is substituted for the invalid primitive. In addition, detect circuit 314 checks the running disparity of the datastream at the point of the error (i.e., the running disparity of the word preceding the invalid primitive). Detect circuit 314 sends a disparity signal to primitive generator 320 so that primitive generator 320 outputs a primitive which maintains valid running disparity. When detect circuit 314 detects invalid data or an invalid primitive between data frames, detect circuit 314 sets an interframe error flag. In response to setting of the interframe error flag, output control circuit 316 selects data input C of multiplexer 318 so that buffer data is substituted for the invalid data or invalid primitive. *[emphasis added]*

⁴ See Application as filed, page 1, lines 10-26.

Most SONET transmission systems use some form of line-level protection facility (such as those known as "1+1", "1:1", "1:n") in order to provide a high degree of reliability to data transport. These protection facilities provide a level of certainty that data transport will continue in the event of a line failure, but the known facilities are not able to prevent temporary interruptions of service.

schemes that the present invention overcomes. Transmission of corrupted data causes the buffer-to-buffer count between the SOF output and the SOF indicator. This introduces latency into the network, the very problem that Applicants attempt to overcome. Indeed, Applicants state "that it is the maintenance of the buffer-to-buffer count integrity to which the invention is directed and not the remainder of the frame...."⁵

The present invention utilizes a SOF detector which determines whether or not the SOF indicator of the current frame is corrupted. If the SOF detector determines that the SOF indicator is valid, the SOF output signal causes the multiplexer to transmit the data to the FC client receiver. If the SOF detector determines that the SOF indicator is corrupted, *the remainder of the frame is ignored and transmission of that corrupted frame is suppressed.*⁶ By eliminating transmission of the corrupted frames, Applicants are able to maintain the integrity of the buffer counts, and avoid the latency that is introduced to the network by line-level protections such as the one disclosed in the '269 patent. The '269 patent does not disclose, teach, or suggest the transmission of an idle frame in response to a corrupted SOF.

Applicants have considered the other references cited by Examiner. Neither Brewer '026 nor Henson '299 disclose anything pertinent to the present invention beyond that contained in Brewer '269.

SONET systems typically monitor the working line and, if and when a certain number of data frame defects are detected within a predetermined amount of time, the system switches over to another transmission line which is referred to as a protection line. Normally it takes in the order of tens of milliseconds from the point in time that the first defect is detected to the point at which data traffic on the protection line is restored. At the gigabit data transmission speeds of fiber channel (FC) links such a switching time period may represent in the order of several thousands of data frames. During this period corrupted data frames may be transported to the fiber channel client receiver and this may cause performance degradation or link failure due to the fact that the receiving equipment may incorrectly account for corrupted frames and cause the buffer-to-buffer credit count between the sending and receiving equipment to become incoherent.

⁵ See Application as filed, page 5, lines 8-10.

⁶ Id. at page 4, line 23 – page 5, line 4.

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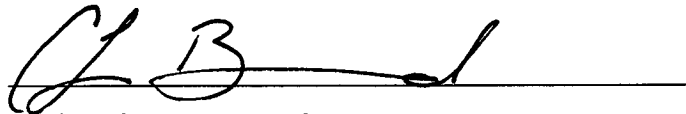
For the above reasons, Applicants submit that the rejection of Claims 1-4 under 35 U.S.C. 103(a) has been traversed and respectfully request that this rejection be withdrawn.

CONCLUSION

Applicants would like to thank Examiner for the attention and consideration accorded the present Application. Should Examiner determine that any further action is necessary to place the Application in condition for allowance, Examiner is encouraged to contact undersigned Counsel at the telephone number, facsimile number, address, or email address provided below. It is not believed that any fees for additional claims, extensions of time, or the like are required beyond those that may otherwise be indicated in the documents accompanying this paper. However, if such additional fees are required, Examiner is encouraged to notify undersigned Counsel at Examiner's earliest convenience.

Respectfully submitted,

Date: October 19, 2005

A handwritten signature in dark ink, appearing to read 'CLB', is written over a horizontal line.

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